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Amendment and Response
Applicant: Daniel Lyle Callahan et al.
Serial No.: 10/615,011
Filed: July 8, 2003
Docket No.: 20030856 -1 (H300.210.101)
Title: FORCE DISTRIBUTING SPRING ELEMENT

IN THE CLAIMS

Please amend claims 3-10, 16, and 21 as follows:

1-2. (Canceled)

3. (Currently Amended) An electronic component system comprising:

a land grid array module;

a printed circuit board having a first side and a second side;

an interposer disposed between the module and the first side of the printed circuit board;

a backing plate spaced from, and disposed on the second side of the printed circuit board opposite the first side;

a plurality of posts extending through and connecting the module, the printed circuit board, the interposer, and the backing plate relative to each other; and

a curved spring member disposed between the backing plate and the second side of the printed circuit board, and including:

a first portion in secured contact with the backing plate and spaced from the second side of the printed circuit board in an assembled state of the system; and

a second portion in unsecured, pressing contact against the second side of the printed circuit board adjacent a center of the printed circuit board

wherein the curved spring member retains a generally curved shape in both an unassembled state of the system and in an assembled stated of the system.

4. (Currently Amended) The system of claim 3 wherein the second portion of the curved spring member comprises a central body portion and the first portion of the spring member comprises a plurality of leg members radially extending outward from the central body portion with an end of each leg member including a hole configured for receiving one of the posts to secure the spring member relative to the backing plate.

PAGE 4/16 * RCVD AT 9/21/2006 2:12:31 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/35 * DNIS:2738300 * CSID:612 573 2005 * DURATION (mm-ss):03-06

5. (Currently Amended) The system of claim 4 wherein the legs and the central body portion of the curved spring member are configured with a curved shape so that a convexity of the curved spring member faces the second side of the printed ~~wired~~ circuit board.

6. (Currently Amended) The system of claim 5 wherein the curved spring member includes the hole of each leg member having an elongate shape configured to permit limited sliding movement of each leg of the curved spring member relative to each of the posts.

7. (Currently Amended) The system of claim 3 wherein the central body portion of the curved spring member defines a body of material formed without holes.

8. (Currently Amended) The system of claim 3 wherein the second portion of the curved spring member comprises a curved central body portion and wherein the backing plate includes a recessed portion defined in a main body of the backing plate that is configured to receive the first portion of the curved spring member.

9. (Currently Amended) The system of claim 8 wherein the recessed portion of the backing plate has a width less than a width of the main body of the backing plate and has a length less than a length of the main body of the backing plate, and the curved spring member is sized and shaped to be removably secured within the recessed portion of the backing plate.

10. (Currently Amended) The system of claim 3 wherein the curved spring member is a single member that provides the substantially all of the compressive clamping force on the system.

11. (Previously Presented) A force distributing mechanism comprising:

means for securing a land grid array module and a printed circuit board in electrical communication with each other including introducing a contact force between an array of contact elements of the land grid array module and an array of contact elements of the printed circuit board; and

means for maintaining and distributing the contact force substantially uniformly across the contact array of the land grid array module and the contact array of the printed circuit board, wherein in an assembled state of the land grid array module and the printed circuit board, the means for maintaining and distributing the contact force is in direct contact with the printed circuit board adjacent a center portion of the printed circuit board relative to the land grid array module and is spaced from the printed circuit board adjacent an outer portion of the printed circuit board relative to the land grid array module.

12. (Previously Presented) The mechanism of claim 11 wherein the means for securing comprises at least one of:

an interposer disposed between the land grid array module and the printed circuit board;

a plurality of load posts extending through each of the land grid array module, the printed circuit board, the interposer, and the means for maintaining and distributing the contact force; and

a stiffening plate disposed on a side of the printed circuit board opposite the interposer and the land grid array module, and fixed to the load posts to be spaced from the printed circuit board.

13. (Previously Presented) The mechanism of claim 12 wherein the means for maintaining and distributing comprises:

a spring member disposed between the printed circuit board and the stiffening plate and having a first portion in contact with the backing plate and a second portion in pressing contact against the printed circuit board, wherein the spring member has a curved shape arranged to forcibly press against the center portion of the printed circuit board relative to the land grid array module.

14. (Original) The mechanism of claim 13 wherein the second portion of the spring member comprises a central body portion and the first portion comprises a plurality of legs extending radially outward from the central body portion, with each leg having an end with a hole configured for receiving one of the load posts and the end configured for contact against

the stiffening plate adjacent the load posts at each of a plurality of corners of the stiffening plate.

15. (Original) The mechanism of claim 12 wherein the means for securing a module comprises:

a plurality of load springs carried on the load posts and configured and positioned for exerting a compressive force on the land grid array module, the interposer, and the printed circuit board.

16. (Currently Amended) A method of distributing a contact force between a land grid array module and a printed circuit board, the method comprising:

securing the land grid array module to a first side of the printed circuit board via an interposer disposed on the first side of the printed circuit board and via a backing plate disposed on, and spaced from, a second side of the printed circuit board; and

biasing a curved spring member between the backing plate and the second side of the printed circuit board to insure a substantially uniform contact force across the land grid array module, the interposer, and the printed circuit board wherein a first portion of the spring member is in secured contact with the backing plate and the first portion of the spring member is spaced from the printed circuit board in an assembled state of the land grid array module, the printed circuit board, and the spring member, and wherein a second portion of the spring member is biased in unsecured, pressing direct contact against the second side of the printed circuit board, wherein the curved spring member retains a generally curved shape in both an unassembled state of the system and in the assembled stated of the system.

17. (Original) The method of claim 16 wherein securing the land grid array comprises:

extending at least one load post through each one of four corners of the land grid array module, the interposer, the printed circuit board, and the backing plate; and

introducing, with a load spring mounted on each one of the load posts, a compressive force between the land grid array module, the interposer, and the printed circuit board.

18. (Previously Presented) The method of claim 16 wherein biasing a spring member comprises:

constructing the backing plate to include a recess for receiving and removably securing the first portion of the spring member on the backing plate.

19. (Original) The method of claim 16 wherein biasing the spring member comprises:

using the spring member to provide substantially all of a compressive force exerted on the land grid array module, the interposer, and the printed circuit board.

20. (Previously Presented) An electronic component system comprising:

a land grid array module;

a printed circuit board having a first side and a second side;

an interposer disposed between the module and the first side of the printed circuit board;

a backing plate spaced from, and disposed on the second side of the printed circuit board opposite the first side;

a plurality of posts extending through and connecting each of module, the printed circuit board, the interposer, and the backing plate relative to each other; and

a curved spring member disposed between the backing plate and the second side of the printed circuit board, and having a first portion in secured contact with the backing plate and a second portion in unsecured, pressing contact against the second side of the printed circuit board adjacent a center of the printed circuit board,

wherein the second portion of the spring member comprises a curved central body portion and wherein the backing plate includes a recessed portion defined in a main body of the backing plate that is configured to receive the first portion of the spring member.

21. (Currently Amended) The system of claim 20 wherein the recessed portion <u>of the backing plate</u> has a width less than a width of the main body of the backing plate and has a length less than a length of the main body of the backing plate, and the <u>curved</u> spring member is sized and shaped to be removably secured within the recessed portion of the backing plate.

22. (Previously Presented) A method of distributing a contact force between a land grid array module and a printed circuit board, the method comprising:

securing the land grid array module to a first side of the printed circuit board via an interposer disposed on the first side of the printed circuit board and via a backing plate disposed on, and spaced from, a second side of the printed circuit board; and

biasing a curved spring member between the backing plate and the second side of the printed circuit board to insure a substantially uniform contact force across the module, the interposer, and the printed circuit board wherein a first portion of spring member is removably secured within a recess of the backing plate and a second portion of the spring member is biased in unsecured, pressing direct contact against the second side of the printed circuit board.